

## THE SINCLAIR/TIMEX USERS MAGAZINE

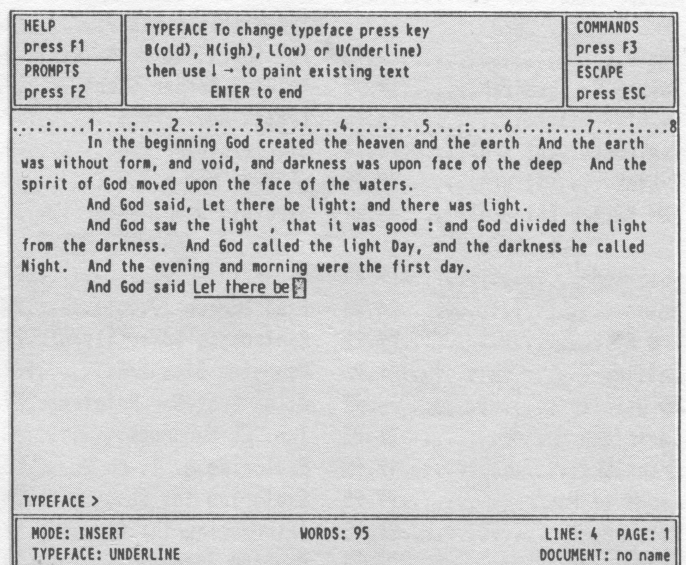
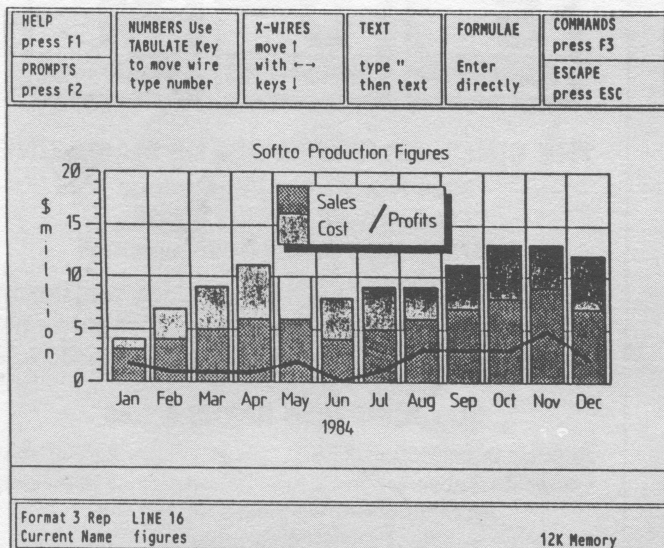
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Volume III

DECEMBER 1985

Number 12

### Evaluating the Sinclair QL

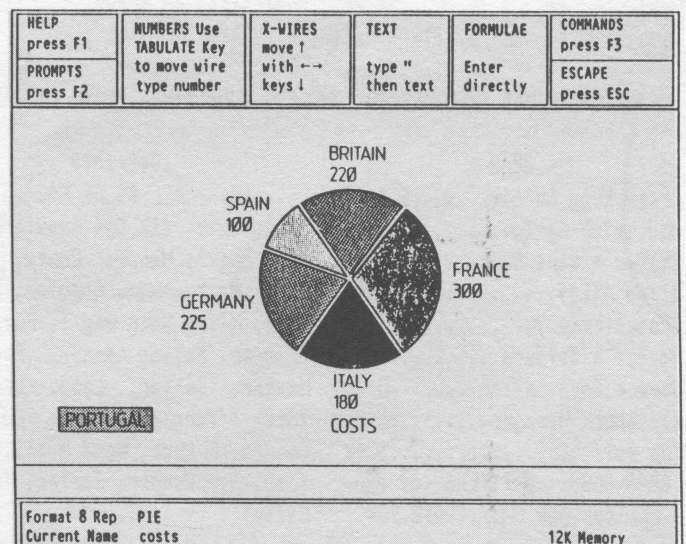


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## Sinclair QL Microcomputer

### — A Review and Evaluation —

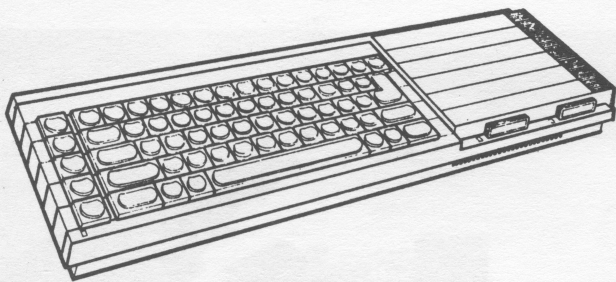
The Sinclair QL was first announced in Great Britain in January 1984. Sinclair was not able to begin delivery for about 5 months after that, but did manage to obtain about 15,000 back orders for the computer during that time. Early production models suffered all sorts of problems, including software that crashed, dead-on-arrival machines, and an operating system that would not fit on the motherboard, part of it being included on a ROM cartridge inserted on the back of the machine. Since then, the QL has undergone a lot of maturing. It was first offered to the American public through a mailing done by American Express (as had been done several years before with the ZX-81). Again shipments were not actually made for several months after the advertising began.

Original price of the QL in England was #399. In America it was originally offered

for \$499. September 1, 1985 the English machine was re-priced at #199. November 1, the U.S. version was lowered to \$299. Such price cuts were probably designed to move stock faster and create a greater interest in the home computer market. No doubt it also upset owners who purchased just a few days before the price adjustments and who received no rebate!

SUM Magazine purchased its QL from the English Micro Connection company, one of a number of new dealers Sinclair has for their computer in America. A printer and an RGB monitor is also available direct from Sinclair to match the QL.

In the box SUM received was the computer, a power supply, TV switchbox & lead, two small cases containing the microdrive cartridges, and 10" x 12" four-ring black notebook with a 400 page indexed manual inside.



## Up and Running .

Removing the computer from its styro-foam packing, two small plastic legs were snapped on underneath and the computer set on the desk. It weighs about twice that of a T/S-2068, and is about 4 inches longer and 2 inches narrower from front to back. Plugging in the power supply reveals a Sinclair trait--no on/off switch. To begin with, no RGB monitor was available, and a TV seemed inappropriate, so a regular composite monochrome monitor was hooked up by cutting the plug off one end of its video cable, the two wires bared, and inserted in pin holes 2 (ground) and 3 (composite mono out) of the QL's RGB output. A separate set of typed sheets included with the manual has monitor and printer hookup instructions.



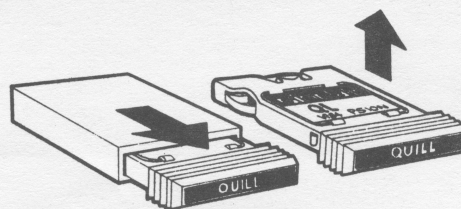
The Copyright Screen

Once on, the screen displays a choice of pressing Function Key 1 for monitor or Function Key 2 for TV. Pressing F1 put the computer in 80 column mode but the screen was unstable due to uncontrollable vertical roll. A RESET button on the right end of the keyboard returns the screen to the opening choices. F2 provides a 40 column display. 80 column mode could now be selected by typing MODE 255 and the screen did not roll at all. Apparently the F1 setting is intended for the RGB monitor Sinclair supplies, as another monitor connected to the QL did not roll as badly when F1 was selected but the edges of the

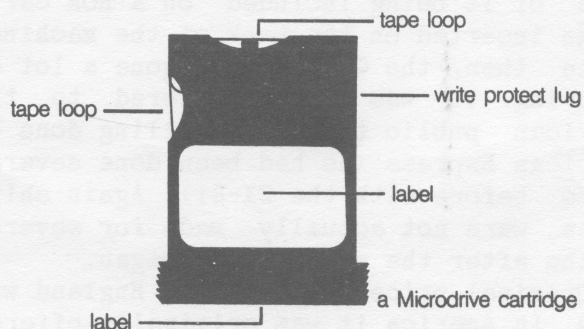
screen were not visible (called overscan). 80 column when accessed via the MODE command did not suffer from overscan on the same monitor.

The SuperBASIC language included in the QL is powerful but confusing to veteran T/S users. To those new to computers in general, it probably is even more confusing as the manual is not designed as a tutorial on BASIC. Keywords must be typed in instead of entered with single keys as on older Sinclair machines. Windows must be created to display to the screen. Enough of the keywords are different to shake the confidence of 2068 owners, but at least the syntax is still checked as each line of BASIC is entered. Full support of the microdrives is implemented in BASIC. More features and the use of the QL SuperBASIC will be covered in future SUM articles.

## Microdrives, etc.



Having never used microdrives before, the usual rule of "if all else fails, read the directions" was resorted to. The software included with the QL is a word processor (Quill), filer (Archive), spreadsheet (Abacus), and charting and graphics (Basel). These four programs are on four cartridges. An additional four blank cartridges are included. The manual instructs that the blank cartridges must be prepared for use by FORMATTING. It is recommended that each cartridge be run through the format routine several times to allow the tape to stretch or otherwise adjust to running in the drives. A simple program I devised to do this is as follows:





```

10 FOR n=1 TO 6
20 FORMAT mdv1_
30 NEXT n

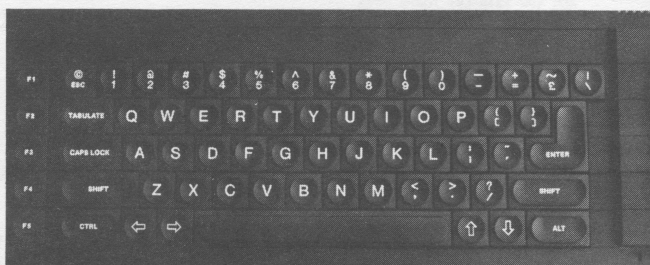
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Placing a blank cartridge in microdrive 1 (mdv1) and running the above program will suitably format each cartridge.

After formatting, backup copies should immediately be made of each program as per the instructions in the manual. CLONing of the original cartridges takes about 5-6 minutes per cartridge. Afterward, the original should only be used to make other clones, and the copies be used to work and run from.

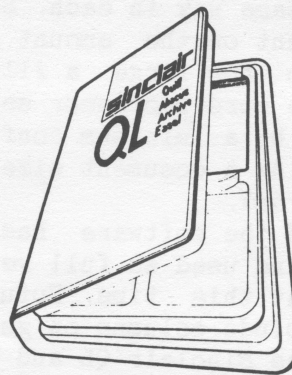
Loading software from microdrive is easy. LRUN mdv1\_BOOT loads and runs each of the included programs. BOOT is actually a short BASIC program on each cartridge that accesses the machine code portion of the appropriate software. BOOT can be loaded and listed to see how it does its work.

Anyone purchasing a QL should note that additional cartridges should be purchased at the time of QL purchase since all four blank cartridges are used to back up software. Cost is about \$3 each.



By this time, the QL keyboard had given some indication of its nature. First, it is laid out in the style of a typewriter so typists find the keys in all the right places. The five function keys arranged vertically down the left side are used extensively by the included software but no way to program them for user created software could be found. The keys make a small noise on pressing, but noise alone is not enough to assure that a character was entered. It is friendlier to typists than the 2068 or Spectrum Plus ever were, but occasional duplicate letters or skipped letters are possible when typing at faster rates. On a scale of 1 to 10 (best), the 2068 gets 5, the Spectrum Plus a 4, and the QL a 7. Any user of the IBM PC keyboard knows that it rates no better, though for different reasons.

## Bundled Software



As has already been mentioned, the QL is shipped with four business application programs. While some manufacturers bundle software with their systems because they can purchase it at a very low price, and the user will soon seek other packages more to his liking, not so with the QL. When Apple Computer introduced its Macintosh, it came with two powerful packages called MacWrite and MacPaint. Many Mac owners have never found the need for another word processor or drawing package as a result! This may well be the case with the software bundled with the QL!

With so much software being written for all the computers on the market, comparisons are natural. Quill word processor would be about equal to packages selling for \$100-150 on the IBM PC. It is not as powerful as the newest word processors, but compares favorably to software introduced a year or more ago. It will probably hinder the introduction of other word processors for the QL since it has no glaring faults.

Abacus is certainly no Lotus 1-2-3 but will give Multiplan, a popular package for other machines, a run for its money. Archive is undoubtedly the most powerful of the four...in fact, so powerful that some users may become discouraged before learning to use it. It certainly would go for \$150-250 on the IBM market. Already many "applications" packages are appearing for it which let the user tap its features in specific applications without having to learn how to program it. Easel is a business chart program, and more. Similar software may sell for \$200 for the IBM. David Ahl of Creative Computing reviewed an English version of the QL in December 1984. At a time when the QL sold for \$499 he enthusiastically stated that Easel by itself would justify the purchase of a QL.

Screen layout on all four programs is similar and the function keys and commands are used the same way in each. Each package is dependent on the amount of memory available as to how large a file it can work with. The word processor seems to be hindered most by a minimum configuration of 128K, allowing a document size of about 7K (or 1100 words).

Here at SUM the software has not been fully tested and used so full reviews are not possible at this time. Future issues of SUM will include columns on getting the most out of the Sinclair QL and its software. There are some features that can be discussed however to give potential purchasers an idea of each program's power.

## Quill

Quill is a very user friendly software package allowing light to medium word processor users to put their QL to work right away. As the QL comes standard with only serial ports, a serial printer must be used for output or a "serial to parallel" converter be purchased for use with a centronics interface printer. When Quill is

HELP press F1	CURSOR move ← with ↓ keys →	TEXT Insert New para Delete Change mode	Type at Press ENTER CTRL & ←→ SHIFT & F4	TYPEFACE Press F4	COMMANDS press F3 ESCAPE press ESC
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.....1.....2.....3.....4.....5.....6.....7.....8

MODE: INSERT WORDS: LINE: 1 PAGE: 1  
TYPEFACE: DOCUMENT: no name

loaded from microdrive, it presents an 80 column (characters per line) screen if F1 was selected when the QL was first turned on, or 64 columns if F2 (TV) was chosen. A 38 column mode can also be selected once in the program. In fact, the user can go back and forth at will between 40, 64, and 80 column. The 64 character display is the most pleasing and recommended for most work. Color of the print on the screen can

also be selected between green or white. Green, white, and red are all used effectively to display parameters and commands on screen. Page, line, and word counts are maintained on screen, as well as printer typeface selected (bold, underline, etc.) and mode (Insert, Overwrite, Delete).

Entering text consists of merely putting the cursor where you wish to type, and beginning. More experienced users can show more lines on screen and turn off the command lines at the top of screen by use of F2. F3 gives access to commands allowing selection of Margin, Header, Footer, Tabs, Justification, Searches, Block Copy or Delete, Save, Load, and File Maintenance. F4 selects typestyle to be output to printer: Normal, Bold, Underline, Superscript or Subscript.

HELP press F1	TYPEFACE To change typeface press key B(oid), H(igh), L(low) or U(nderline) then use ← → to paint existing text ENTER to end	COMMANDS press F3 ESCAPE press ESC
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.....1.....2.....3.....4.....5.....6.....7.....8

In the beginning God created the heaven and the earth. And the earth was without form, and void, and darkness was upon face of the deep. And the spirit of God moved upon the face of the waters.  
And God said, Let there be light: and there was light.  
And God saw the light, that it was good: and God divided the light from the darkness. And God called the light Day, and the darkness he called Night. And the evening and morning were the first day.  
And God said Let there be

TYPEFACE >

MODE: INSERT WORDS: 95 LINE: 4 PAGE: 1  
TYPEFACE: UNDERLINE DOCUMENT: no name

What is displayed on screen accurately reflects the actual printout. Page breaks are shown as well as bold, underline, and super- and subscripts. Files created on the other applications can be IMPORTed or MERGEed into a Quill document. A very useful command is HYPHEN which allows a "hidden hyphen" to be inserted in a long word. This hyphen will be used by Quill if it has to separate the word to get proper word fit on a line; if not used, the hyphen is ignored, but may be used later if that section of text is reformatted and a hyphen becomes necessary. Paragraphs and lines are automatically reformatted as corrections, additions, and deletions are made.

The only real weakness I have found in Quill is the necessity of going into BASIC and the "Install\_Bas" program to install



the printer of choice. As only normal, bold, underline, and super- and subscript is supported in Quill in its original version, other options like pica or elite, italic, near letter quality, proportional, or other features your printer supports must be programmed in by assigning printer codes to some of the unused characters on the keyboard. Unfortunately this is not explained in the Quill section of the manual but in the very back of the manual under "Information".

## Other Software

HELP press F1	CURSOR press ←→ GOTO CELL press F5	DATA & FORMULA enter directly & press ENTER	TEXT type" followed by text & ENT.	COMMANDS press F3 ESCAPE press ESC
PROMPTS press F2				

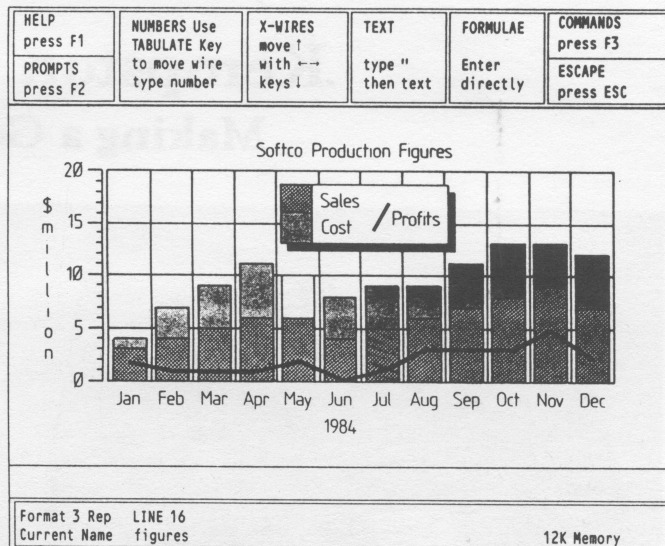
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CELL	GRID USED	MEMORY 23K
CONTENTS		

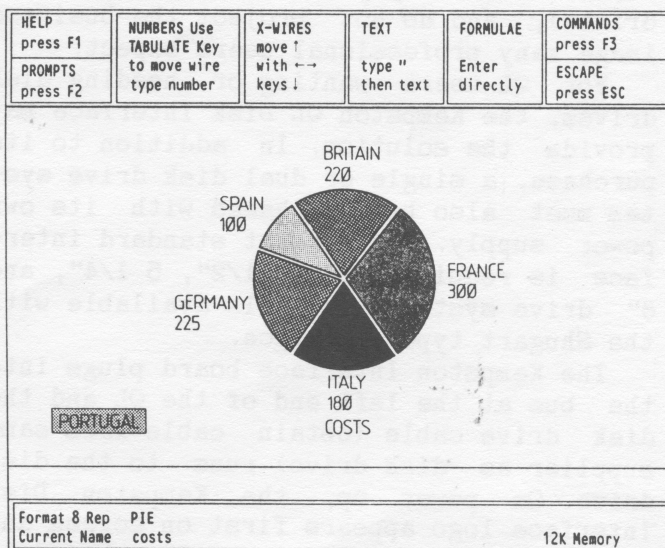
The Abacus spreadsheet and other software have not yet been fully tested. But the following facts have been garnered from the manual. A spreadsheet as large as 256 rows or 64 is possible (but not both with only 128K). Rows, columns and individual cells can be assigned names and then referenced later in formulas by those names. Column widths are variable; spreadsheets can be linked together.

Archive is a database filing system in the style of dBaseII--that is, it has its own programming language to allow accessing its full power and versatility. It is supposed to be fully interactive with the other three software packages in importing and exporting data. Files can be sorted, searched, linked, designed, and printed out in almost any manner. As already mentioned, a number of "templates" or pre-programmed filing frameworks are already available and several usable examples of simple databases are included in the manual. This is undoubtedly the most powerful of the programs included with the QL and, again, could justify the purchase of the



whole system just for it.

Easel enables the creation of charts: bar, line, pie, mixed lines and bars, horizontally or vertically. And with just a couple of keystrokes the same data can be replotted in a different format and then toggled back to the first. Printout to an Epson printer (and probably others) is outstanding. Text can be entered anywhere on or around the chart. Data can even be defined or manipulated by math functions and formulas and then displayed.

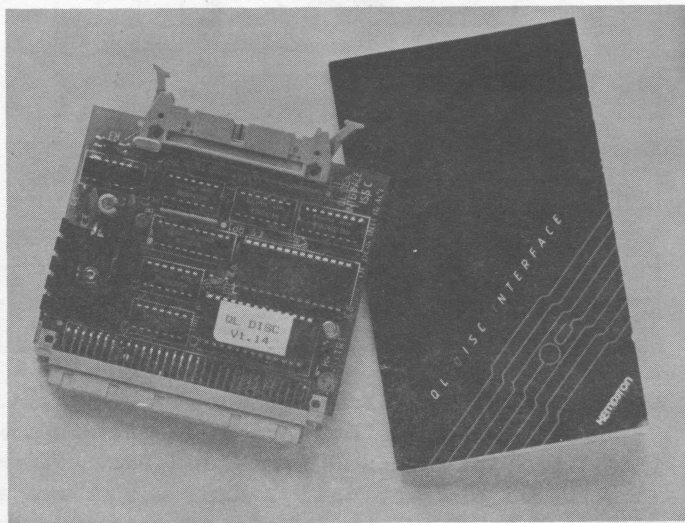


In depth reviews and helpful articles for beginners and more advanced users will be included in future issues. Meanwhile, why not join the revolution and learn what all the excitement is about. A number of QL dealers are regular advertisers in SUM.

-- Richard Cravy

# Kempston QL Disk Drive

## Making a Good Thing Better



The Sinclair QL comes equipped with two Microdrives. They offer much faster access and reliability (as well as convenience) than older cassette tape systems. But Microdrives do have their limits. They provide only about 100K of storage, suffer some reliability problems (tapes, not the drives), and do not project the business image many professional users expect.

For QL users wanting or needing disk drives, the Kempston QL Disk Interface may provide the solution. In addition to its purchase, a single or dual disk drive system must also be purchased with its own power supply. The Shugart standard interface is required. 3", 3 1/2", 5 1/4", and 8" drive systems are all available with the Shugart type interface.

The Kempston Interface board plugs into the bus at the left end of the QL and the disk drive cable (obtain cable from same supplier as disk drive) runs to the disk drive. On power up, the Kempston Disk Interface logo appears first on screen and then the standard QL logo. The board is well made and once installed does not have to be removed from the machine.

QL users know that the Microdrives are accessed by name: mdv1 and mdv2. The disk drives may be addressed as flp1 and flp2. In using commercial software that does not expect a disk drive to be connected, but only the Microdrives, "FLP\_USE mdv" will allow the software to access the disk when it makes a Microdrive call.

Here at SUM, our QL is connected to a pair of Amdek 3" drives known as Amdisk 3 and available from companies like Ramex and English Micro Connection. Hooking the hardware up was easy.

It took a little longer to figure out how to use the Quill word processor with the disk drives. What is said here about Quill will also be true of the other software that comes with the QL. To configure Quill to work with the Kempston interface and disk drives, two diskettes must first be FORMATTed. Then a copy of Quill on Microdrive wafer is put in mdv1 or mdv2 and the COPY command used to transfer copies of each file on the wafer to diskette. Next, the CONFIG\_BAS program is LOADED either off the wafer or the diskette. Type "flp\_use mdv" and ENTER. Now type RUN and ENTER to run the configuration file already loaded. Change all "mdv1" references to "flp1" and all "mdv2" references to "flp2" (or "flp1" if only one disk drive). Save the new CONFIG\_SYS file to disk. Now Quill can be loaded and run from disk drive, and files created by Quill will save and load from disk drive.

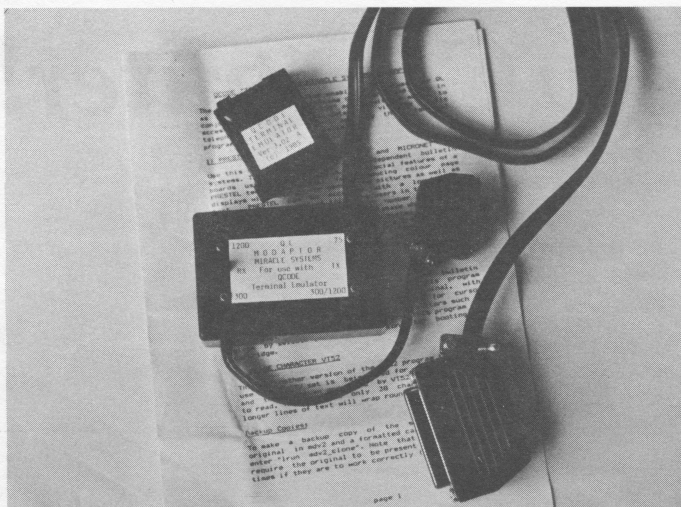
A number of extra file commands are in the Kempston ROM: STATUS, RENAME, TRUNCATE and VIEW are all pretty self-explanatory. Since the QL can use windows, special commands for working in windows are included: WDIR, WSTAT, and WDEL. Various commands for random access saving and accessing of data are also available.

After several weeks of use, SUM's QL Microdrive has not yet lost a wafer, but the experience of others shows that it is inevitable. Our disk drives and Kempston interface have also performed admirably, so that now all word processing is done to and from disk at a speed roughly 6 times faster than Microdrive. My belief is that home users of the QL will be happy with the Microdrive units for a long time as long as they keep at least two copies of all software in addition to the originals. Business and "power" users of the QL will want the convenience, safety and flexibility of disk drives. The Kempston unit performs admirably. Other manufacturers have similar units out. -- Richard Cravy



# Using a Modem with the QL

One of the most exciting things that a computer can be used for is telecommunications. The QL is not behind others in this regard. A nifty little device called the "QL MODAPATOR" provides the special cable and software needed to connect the QL to any standard modem. In reviewing the Modadaptor I used a Hayes Smartmodem.



The Modadaptor plugs into SER2 (serial port 2) of the QL and into modems with DB-25 serial connectors. The software is on a microdrive cartridge which should immediately be put in MDV2 (microdrive 2) and copied using the "clone" program found on it. Note that the original cartridge will still need to be inserted in MDV2 as one part of the cartridge will not copy and will need to be accessed by the software occasionally (this was done for copy protection).

Boot the software with LRUN MDV1\_BOOT and wait. An opening menu offers several options including help files, Prestel and Micronet access, and VT52 access. As Prestel and Micronet are English systems, one of the two VT52 selections should be made for accessing American BBSs (Bulletin Board Systems), other modem equipped computers, and services like Compuserve or the Source. Two VT52 selections are available to allow for 80 column or 40 column screen display.

As an aside, the software also provides QED, a built-in "word processor" allowing the creation of text files which can later be transmitted to other systems.

After selecting VT52, another screen is loaded which allows you to configure your "terminal" (the QL) to the specifications of the BBS or system you are preparing to access. These include baud rate of transmission and reception, handshaking, parity, etc. (information generally available from the system you are going to access). Two switches on the small box in the middle of your RS-232 cable going to the modem should be set to match your software selections. Finally, CTRL 3 (hold down on the CTRL key while pressing "3") should be entered to go into the terminal mode. CTRL 1 returns you to "local" mode if you later discover you need to re-configure your terminal.

With the Hayes Smartmodem plugged into the wall where the phone normally goes, commands given in the Hayes manual can be used. (Make sure the modem is turned on.) To call a BBS such as the Zebra BBS, type AT DP17182962229. "AT" signals a command to the modem. "D" is for dial, while "P" is for pulse ("T" could be used for touchtone phone lines). The long string of numbers is simply the phone number including the "1" the phone system requires for long distance numbers. The commands used by other modems may be different but the basic process will be the same.

Though a long time computer user, this was my first experience with telecommunications. It took a little experimenting as the instructions included with the Modadaptor are not always clear. Experienced users would probably have little trouble. The fact that the Modadaptor was designed for the English market means that much of the 4 pages of instructions are directed at the Prestel and Micronet Systems over there and have little meaning to us unless someone wants to have some LARGE long distance phone bills. Nevertheless, I can highly recommend the Modadaptor to all who wish to "reach out and touch someone" with their new QL.

QL Modadaptor with QCode Terminal Emulation Software is made by Miracle Systems Limited and is available from the English Micro Connection, 15 Kilburn Court, Newport, RI 02840; 401/849-3805. Price: \$65.

-- Richard Cravy

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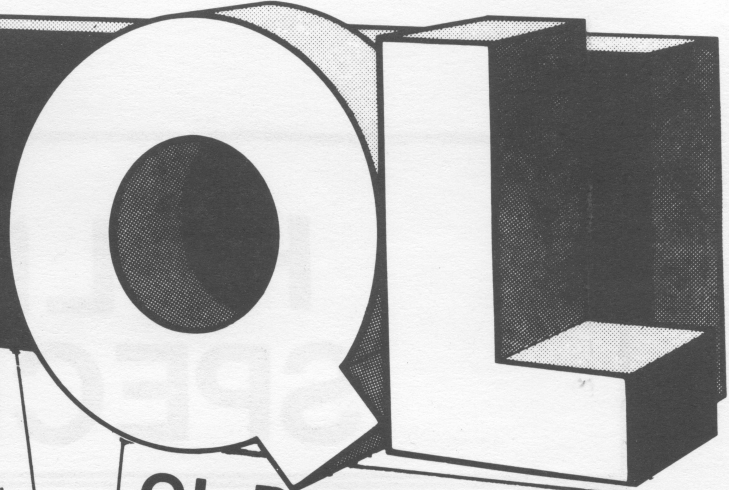
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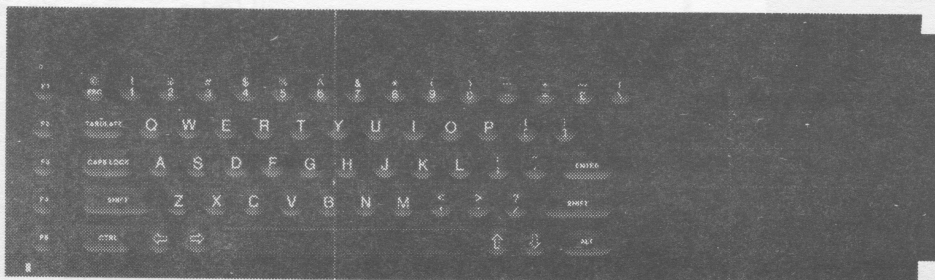
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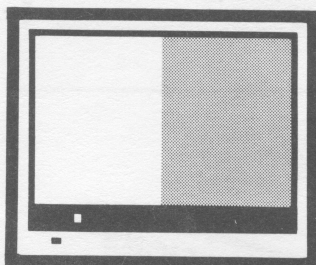


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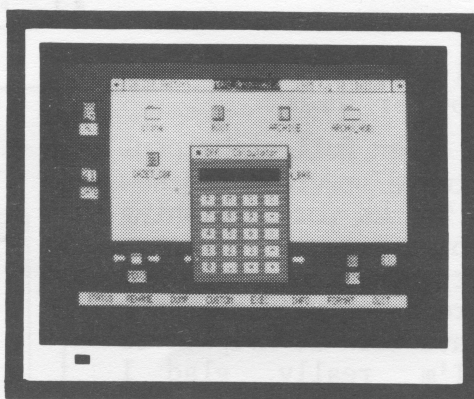
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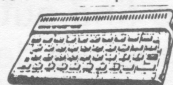
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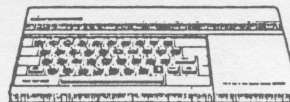
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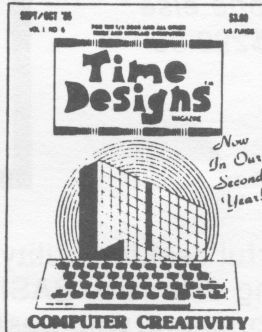
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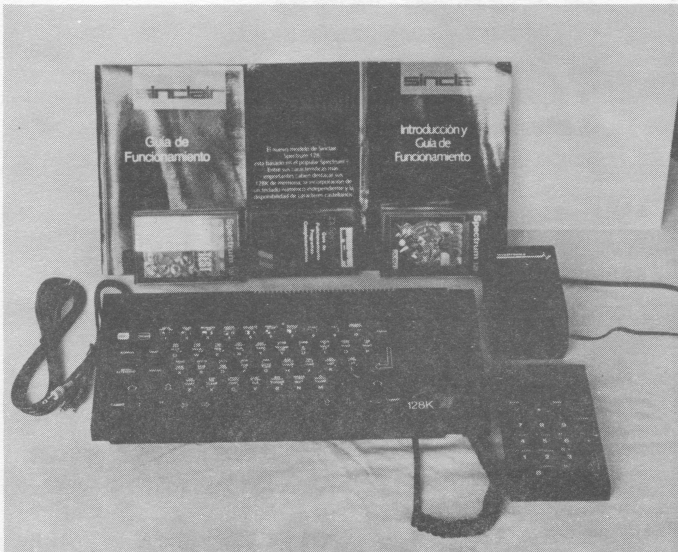
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## Preview: Sinclair 128



SUM MAGAZINE has recently been able to obtain a Spanish version of the new Spectrum 128 Sinclair computer for evaluation. Next month we intend to have a full review and description of it. This computer is expected to be available in an English version on the English market in about two months. Except for Spanish language keys and prompts, our review model is believed to be the same.

The Spectrum 128 uses the same case as the Spectrum Plus computer. However, the "128K" logo in the lower right, the RS-232 and RGB ports on the side and back, and the separate numeric/cursor keypad marks it as being a different machine. The feel of the keyboard is also better than the Plus and comes much nearer to that of the QL. The RGB port allows direct connection to RGB and composite video monitors which the Spectrum Plus did not provide. The RS-232 port can be used for modems or the Spectrum QL or other serial printer (with proper cable).

The two most interesting features of the 128 is its extra memory and the keypad which plugs into the front of the keyboard and offers both cursor and numeric entry. When in 128K mode, the keypad provides a full screen editor, in effect a simple built-in word processor. The CMND key puts the pad in editing mode. The various cursor marked keys allow moving left or right one character, up or down one line, one

page, or to the beginning or end of your document. Apparently the DELETE command can be used in connection with some of the cursor keys for block deletion functions.

Other editing functions available include setting the left margin, word wrap, and insert on/off. These editing functions can be used in both text files and in program listings making programming much easier. Software houses should be able to write much more powerful word processing programs using the built-in editing features of the 128, since most of the basic functions do not have to be programmed in.

When the computer is first turned on, it is in 128K mode. In this mode, access to the added 64K is possible as if it were a type of 64K disk drive. Files and programs can be saved to and loaded from it in just a second or two. While in 128K, BASIC keywords have to be typed in, that is, instead of pressing the "J" key for LOAD, the actual letters L, O, A, and D must be pressed in capitals. Two 128K games included with the computer show some of the power of the "RAM disk". "Daley Thompson's Super Test" takes 12 minutes, 45 seconds to load from cassette! As different parts of the game are played the computer calls for those sections from the 64K bank and moves on to them without any noticeable lag in the screen. It is very impressive! In addition, that extra memory allows for very detailed and graphically stunning programs which require a lot of memory.

The Spectrum 128 has basically the same sound capabilities as the Timex 2068, but has no built-in speaker, using instead the TV or separate audio amplifier. A MIDI (Musical Instrument Digital Interface) allows connection of various electronic synthesizers, musical keyboards, etc. for advanced music applications.

The Spectrum 128 comes on in 128K mode but can be switched to a regular Spectrum Plus (48K) by typing "SPECTRUM" and pressing the ENTER key then typing NEW and ENTER. This fully emulates the Spectrum Plus. However, this mode can be exited only by turning off the machine or by use of the RESET button.

It is the preliminary opinion of the SUM staff that the Spectrum 128 is a truly



outstanding machine which, along with the QL, should keep Sinclair strong in the English market. Pricing at less than \$300 should make it very competitive with the Commodore 128, and the large software base make it an attractive purchase. The added memory, keypad, and built-in editor will appeal to software developers as more powerful business applications can developed without having to learn a new operating system. There may be some shifting of the price downward to prevent

its competition with the QL. There is no indication that Sinclair will officially bring the computer to the American market, but English Micro Connection and perhaps other U.S. dealers of T/S products will probably import English machines.

SUM's evaluation machine was obtained from the English Micro Connection. Bob Dyl indicates that he can supply Spanish machines now to anyone interested. He has the 128 manual translated into English.

-- Richard Cravy

## Magnavox RGB Monitor Inexpensive Color

Any Spectrum or TS-2068 owner who has seen their model of computer running on an RGB monitor is never really happy with a color TV or composite color or green monitor again. Both computers require an adapter be purchased for such a hook-up, but the real problem is the cost of purchasing the RGB monitor.

While most monitors (and televisions) are prepared to receive their screen info from the computer on a single line which must then be "decoded" by the monitor to pull out red, green, blue colors, etc., the RGB monitor is different. Its signals are already separated before coming into the monitor. The monitor is designed to take these separated out color signals and show them on the screen to greatest advantage. Typically, a composite screen has trouble displaying clear sharp edges to lines and text characters are often fuzzy or have a ghostly duplicate. Borders where two colors meet have a "crawling" effect. All who use them know the effects well. (This is a layman's description.)

However, RGB monitors are generally more expensive and more limited as to the computers that can use them. While a monochrome 12" monitor can be obtained for under \$100 and a color TV for less than \$200 (and can be used with almost all home computers), RGB monitors typically start at \$325 and may require an adaptor (\$50) and custom cable (\$15+) before it can be used. A popular RGB monitor for T/S users is the Sears model which lists in their catalogs for \$339 + shipping. Different

than most, it has television, composite color, and green screen monitor settings, in addition to the RGB ability. This makes it a best buy for many computerists.

Now there is another choice available. Magnavox, also known as NAP, has introduced the RGB Monitor 40, a 13" monitor with a horizontal resolution of about 390 pixels, more than enough for the 2068 or Spectrum which produce 256 pixels across the screen. In addition, the QL does quite well with it if in 64 column mode and is very readable even in its 80 column mode. Both QL and Spectrum graphics are beautiful. The QL generates 512 pixels across.

The Magnavox RGB monitor comes well equipped. Three input modes are available as standard equipment: digital RGB (most computers including T/S), analog RGB (some Apple computers), and composite color. In addition, a green screen switch for monochrome display and an audio input and volume control can be used. Where many monitors only offer controls for brightness, contrast, color, tint, and vertical hold, the Magnavox also allows adjusting sharpness, horizontal hold, vertical and horizontal height and width (very important for QL), and two switches to allow optimum viewing when used with a VCR or camera. Finally, a small built-in tilt stand can be used to angle the screen for more convenient viewing.

For all of these features, I was able to purchase the Magnavox RGB 40 on sale at Service Merchandise for \$199!

-- Richard Cravy

# Header-Reader for 2068

Loading a program into the 2068 is always divided into two parts, The Header and then the program or bytes or array.

R-HEADER reads the header without loading the program. The header contains the following information:

1. Program Type (BASIC, code, array)
2. NAME
3. Length with and without variables
4. Auto-Run line (BASIC)
5. Byte Origin (Code)

Type in the listing and save it before RUNning. Then RUN, Follow instructions. The program will list contents of any headers it encounters from tape.

Real Gagnon  
Quebec

## .Listing 1 : R-HEADER program

```
1 REM _____R-HEADER 2068 by GAGNON-o85_____
2 CLEAR 31999
5 BORDER 0: PAPER 0: BRIGHT 1: INK 5: CLS
10 GO SUB 1000
50 CLS : GO SUB 600: BEEP .01,10: PRINT AT 10,9: INK 0: PAPER 6: FLASH 1:"STA
RT CASSETTE"
60 RANDOMIZE USR 32000
65 BEEP .01,45
69 CLS : GO SUB 600
70 LET ix=32256
80 LET type= PEEK ix
90 PRINT INVERSE 1'("Program:" AND type=0)+("Numeric Array:" AND type=1)+("St
ring Array:" AND type=2)+("Bytes Block:" AND type=3);
100 PRINT INVERSE 0;" ";; FOR n=ix+1 TO ix+10: PRINT CHR$ PEEK n;; NEXT n
110 PRINT INVERSE 1'+"(Prog. + Variable " AND type=0)+("Code " AND type); " Le
ngth:";
120 PRINT INVERSE 0;" ";; PEEK (ix+11)+256* PEEK (ix+12)
130 IF type=1 OR type=2 THEN PRINT INVERSE 1'"Variable:";; PRINT INVERSE 0;"
"; CHR$ ( PEEK (ix+14)-32-64*( PEEK (ix+14)>192))+("$" AND type=2): GO TO 175
140 PRINT ' : PRINT INVERSE 1;("Auto-Run Line:" AND type=0)+("Block Origin:" AN
D type=3);
150 PRINT INVERSE 0;" ";; PEEK (ix+13)+256* PEEK (ix+14)
155 IF type=3 THEN GO TO 175
160 PRINT INVERSE 1'("Program Length:" AND type=0);
170 PRINT INVERSE 0;" ";; PEEK (ix+15)+256* PEEK (ix+16)
175 PRINT ' ' ' OVER 1;"....."
180 PRINT ' ' OVER 1;" S: STOP ENTER: CONTINUE ": PAUSE 0: IF INKEY$ ="s
" OR INKEY$ ="S" THEN STOP
190 RUN
600 PLOT 0,0: DRAW 255,0: DRAW 0,175: DRAW -255,0: DRAW 0,-175: PRINT INVERSE
1; AT 0,9;"R-HEADER 2068"; AT 1,9;" GAGNON-o 85 ' ' '
610 RETURN
1000 REM _____the M.C.
1010 DATA 221,33,0,126,175,17,17,0,55,1,254,254,205,153,100,205,252,0,186,32,240
,219,255,203,191,211,255,175,211,244,201
1020 FOR I=32000 TO 32030: READ A: POKE I,A: NEXT I
1030 RETURN
9991 SAVE "lect2068" LINE 1: VERIFY "lect2068"
```



# Basic Graphics on the 2068

When writing my first article for SUM, I made an assumption that there were many others like myself that did not know much about the graphic abilities of the 2068.

In reviewing the article, I think that it was a good assumption, but assumptions can be dangerous. Many times I have read an article in which the author assumed that the person reading would know or understand a given item. The end results could be a failure to understand what the author was trying to get across. This particularly is true in technical manuals.

A word to those who may be longing to be able to write a program that you have on your mind. DON'T BE DISCOURAGED! If you have the desire to learn and want to bad enough, hang in there, it will come with patience, and perhaps with some help.

There are several things that I intend to cover here. They include forming your program, reasoning it out, the use of PLOT, DRAW, PRINT AT, ON ERROR, POINT, PAUSE, and FOR-NEXT loops.

The first thing that you should do when writing a program is to have a direction in mind, that is, "what do I want to accomplish?", "How do I do this?". Make some notes to yourself such as:

## Notes:

1. Draw squares, form them into a three sided box.
2. Label the sides a, b, etc.
3. Give the dimensions.

## Purpose:

Show how to create box shapes. How to place labels. Show the approach to the problem. Show how to start PLOT & DRAW.

Obviously there are some things that have to be learned here before the program can be written such as how to use the commands which tell the computer what we want it to do. Before we use the DRAW command we must learn how to use the PLOT command.

Begin by getting your 2068 manual out and turning to page 152. There you will find a chart which gives the grid coordinates for the screen. Now notice

that at the lower left hand corner you will see a 0. This is the starting point for the X coordinate (or axis). At the lower right hand corner is the starting point for the Y coordinate. If you read my first article on the 2068 graphics, you will remember the phrase "Why (Y) up and down when (X) across". This is where it came from. The Y axis is the up and down axis and X axis is left to right.

10 PLOT 50,50 tells the computer to move from the lower right corner 50 pixels to the RIGHT and the second number 50 tells the computer to move UP 50 pixels toward the top. The point is then put at the intersection of these two coordinates. You may use any two points within the bounds set by the graph. Try entering a few points of your own.

You may have discovered that you can string these PLOT commands together, that is ; PLOT 50,50: PLOT 100,75 etc. Now try this:

```
10 PLOT 0,100
20 DRAW 40,0
30 FOR N=0 TO 10
35 DRAW N,N
40 DRAW N,0
50 NEXT N
```

In line 10 we have the PLOT command that tells the computer to stay at 0 on the X axis and move to 100 on the Y axis. This specifies the starting point for the DRAW command. When we tell the computer to DRAW 40,0 we are telling it to start at PLOT point 0,100 and move to the right 40 pixels without moving up or down. All PLOT and DRAW commands must have a comma between numbers.

Line 30 sets up what is called a FOR-NEXT loop. What it does is to set N at a value of 0 and increments N each time a NEXT N is encountered and passes again through the loop until N reaches its final value of 10 in this case. Line 35 causes the computer to DRAW a diagonal line as N is incremented with each pass.

Line 40 draws to the right the count of N pixels. This line will continue to be drawn until the full count of 10 has been reached.

These FOR-NEXT loops are useful in many applications in BASIC. Anytime you may want to advance a number value or repeat a PRINT statement, you may use a FOR-NEXT loop. Of course there are rules here also. See Your manual.

We have shown you two ways to DRAW a line. Notice that the FOR-NEXT loop is the slowest of the two and that DRAW is almost instantaneous. Now lets review using the computer:

```
10 CLS: PRINT "A REVIEW OF PLO
T AND DRAW"
20 INPUT "ENTER TWO PLOT NUMBE
RS (0-255),(0-175) ";P1,P2
30 INPUT "ENTER TWO DRAW NUMBE
RS ";D1,D2
40 ON ERROR GOTO 100
50 PLOT P1,P2:DRAW D1,D2
60 PRINT "PRESS ANY KEY TO CON
TINUE": PAUSE 0
80 GOTO 20
100 PRINT "YOUR DRAW NUMBER IS
TOO LARGE.  REDUCE ITS VALUE"
110 PRINT "PRESS ANY KEY TO CON
TINUE": PAUSE 0: GOTO 20
```

#### More about FOR-Next loops

We stated that the loop would count from 0 to the stated high number. But the computer sees the zero as another number. Try this:

```
10 FOR N=0 TO 5
20 PRINT N
30 NEXT N
```

After running, you should have the following printed down the screen: 0,1,2,3,4,5. That's six numbers, not five! If you want a count of five, use: 10 FOR N=1 TO 5 in the above example.

This would return a count of five for N. It is important to remember this when setting up a program in which you will want to be doing a loop. One occasion where you may want to start at zero instead of one is when you wish to PRINT AT a given location on the screen that starts at a zero position. For example:

```
10 FOR N=0 TO 5
20 PRINT AT N,0;"POSITION ZERO
"
30 PRINT AT 5,N;"POSITION ZERO
AT LINE 5"
40 PAUSE 100
50 NEXT N
```

Run the program and study it to understand what the FOR-NEXT has done. The first time through the program the position which contained an N was set to zero. The next time through they were incremented by one and so on until N reaches five. The PAUSE 100 is there to slow the action down so that you may observe the changing locations. PAUSE 100 tells the computer to stop for 100/60 seconds.

Another command that needs to be discussed is the PRINT AT command. This command works in the same manner as the PLOT command except that it has a different set of numbers associated with it. Again referring to the manual page 152. Notice that there are numbers which run from the upper left to the right on the grid, and from the upper left down. These are PRINT AT locations of the screen. To use them, simply decide where on the screen you want the printed material to appear and then insert these numbers into the PRINT AT command.

For example, let's assume that you may want a title to appear at the top of the page and begin text two lines below the title. You would first look at the graph in the manual and pick the locations for the printed matter. Lets try line 0, 10 spaces over, and text is to start on line 2, 5 spaces over. On the computer it would be:

```
10 REM ** PRINT AT locations **
20 PRINT AT 0,10;"TITLE HERE";
AT 2,5;"START SECOND LINE HERE"
```

You may start your line at any line number you wish as long as it is in the bounds of the grid numbers from page 152. However, you also may have to count the spaces available for that line. If you are trying to put words on one line which will take more than 32 spaces they will be sent to the next line and start at position 0 of that line unless you have told the computer to do something else. Remember the FOR-NEXT loop? Well we could use it here for example to space lines or words. Try this:

```
10 REM ** SPACING LINES **
20 FOR N=1 TO 6 STEP 2
30 PRINT AT N,5;"LINE SPACING
BY TWO'S"
40 NEXT N
```



We have another new command, STEP 2. This command simply tells the computer to count by two's instead of by one's. If we had a special case where we wanted to count down from a high number to 0 we could use STEP -2.

OK, if you have stuck with us you are now going to set up the program for drawing a three-sided box. The first thing we have to do is to decide how big we want to make the box and where on the screen we want to put it. We also have to consider the room that the labels will take up on the screen. The best way to do this is to have some graph paper that can represent the graph in the manual.

I should mention one other thing before we start our drawing. Each character is made up of a square of 8 x 8 pixels each on the grid. When the computer sees a PRINT AT command, it sets aside an 8 x 8 square for each letter. This has an effect on our PLOT commands in that it will let you print only in each 8 x 8 grid. This means that you must plan your PRINT statements in relation to your graphics. I will not attempt to go into this further here for it is a subject in itself.

Looking at the graph paper (or the graph in the manual) we will first choose the PRINT AT area for the title. WE will use line 0 so that we have as much of the screen as possible available for future use. You can change them later if you choose. Now remember that we want to label the dimensions of the box, so we will set aside line 18 and columns 5-12 and set aside lines 10-16 and columns 11 & 12 for the side dimensions.

Now we will pick a PLOT location that will put us somewhere near the center of these PRINT AT locations. Looking at your graph you will see that line 10 and column 11 or 12 is a good choice for the focal point of the top right corner of the box. So we will use that as our starting point for the first PLOT. Now try this:

```
200 REM ** DRAW BORDER **
210 PLOT 0,0: DRAW 0,175: DRAW
255,0: DRAW 0,-175: DRAW -255,0
220 REM ** BOX-TITLES-LABELS-
DATA COMPLETE
230 PLOT 75,95: DRAW 10,0: DRAW
10,20: DRAW 0,5
240 PRINT AT 18,5;"W= 10"; AT 1
9,5;"H= 5"; AT 20,5;"L= 5"
250 REM ** DRAWING COMPLETED **
```

Now that you have had a chance to play with the first part of the program, let's go a little farther and learn how to make an auto-DRAW program which will display any size box within the grid areas of the screen.

**WARNING! MAKE SURE YOU SAVE THIS PROGRAM BEFORE RUNNING IT!!**

```
300 REM ** AUTO-DRAW OF BOXES *
310 REM GET DATA
320 INPUT "GIVE THREE DIMENSION
S (H,W,L) ";H,W,L
330 PLOT 75,95: DRAW 0,-H: DRAW
-W,0: DRAW 0,H
340 DRAW W,L: DRAW W,0: DRAW -W
,-L: DRAW -W,0
350 DRAW 0,-H: DRAW W,0: DRAW L
,0: DRAW 0,H
360 PRINT AT 18,5;"W= ";W; AT 19
,5;"H= ";H; AT 20,5;"L= ";L
370 REM ** DRAW AND FILL BORDER
380 PLOT 0,0
390 DRAW 5,5: DRAW -5,5
400 ON ERROR GOTO 420
410 GOTO 390
420 PLOT 0,175
430 DRAW 5,-5: DRAW 5,5
440 ON ERROR GOTO 460
450 GOTO 430
460 PLOT 255,175
470 DRAW -5,-5: DRAW 5,-5
480 ON ERROR GOTO 500
490 GOTO 470
500 PLOT 250,0
510 DRAW -5,5: DRAW -5,-5
520 ON ERROR GOTO 540
530 GOTO 510
540 PRINT AT 1,10;"AUTO-DRAW"
550 ON ERROR RESET
560 STOP
```

## PROGRAM 2

Now run Program 2 above and watch what happens after you enter the data. If the program locked up, check your typing and run it again. There are some unusual things in this program which you don't see very often. We will explain these and leave the others for you to think over.

Note the ON ERROR statements. If the computer detects an error, the program will do as commanded in the last ON ERROR statement encountered. You must be very careful how you use them else you may find your computer "locked up" and turning it off as the only way to get out of it.

Lines 310-360 takes the data for the dimensions and DRAWS the inner and outer border lines. Then starting at line 370, we see the first PLOT followed by a DRAW. It is at this point that we must carefully observe whats going on.

The computer PLOTS its starting point, then it starts to DRAW. But notice that the DRAW is stuck in a loop formed by line 410. Now there are only 175 pixels available going up the grid. When the 175th point is reached, there will be an error generated as the computer tries to PLOT beyond this point. Hence, it goes to line 420 and starts again from there with the commands given in that line. It "drops through" the program until it comes to the end, thus being completed.

At line 550 we see ON ERROR RESET. This tells the computer to clear itself from the previous error commands. Change line 400 to ON ERROR CONTINUE. RUN the program. Now you can see just what happens when the computer "locks up".

Now lets add a new command, POINT, which checks any point of the screen to see if it is "colored" or "filled". If it is, a value of one is returned, if it is not, 0 is returned. Lets use this new command to fill in the box.

To activate this command, we tell the computer where on the screen we want to check for this condition. We know from our PLOT and DRAW statements where this is, but we will start before that point so that you may see better how this command works. DELETE line 560 then add these lines to Program 2:

```
570 REM ** add color fill **
580 LET C=4: REM >>COLOR<<
590 FOR N=35 TO 100
600 PLOT N,95
610 IF POINT (N+1,100) THEN GOT
O 630
620 NEXT N
630 FOR N=N TO N+47
640 PLOT 48,145-N
650 DRAW INK C;47,0: NEXT N
660 STOP
```

Now look at the program starting at line 590. Here we have set up a FOR-NEXT loop. Line 600 starts to PLOT at position N and continues until the conditions at line 610 are met. Now notice here that N is given a value of N+1. The reason this was done is that if we had told the computer to look at the point of N, it

would have seen a value of 1 and started to ink fill there. We don't want this to happen. We need it to fill when the point in front of the N point is 1.

In line 630 a new FOR-NEXT loop is set up for the fill routine. The computer now starts to fill the front of the box. Notice the loop is set up to the dimensions of the front of the box. Again the value of N is one less than that needed (48 would be on the line used to DRAW the box, we want to stop short of this by one count).

(Ed. Note: One good way to learn programming is to try different approaches. In the color fill program, try making the computer "scan" for the beginning of the box, remember this point, then look for the end of the box (the other side) and use the DRAW command to fill the space. Remember DRAW is faster. --JW)

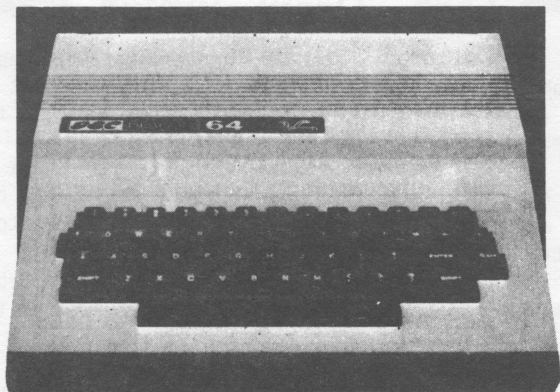
You have been given a lot to digest in this article. You have seen how to use the PRINT AT, PLOT, DRAW, FOR-NEXT, STEP, ON ERROR, POINT, and PAUSE commands. You have also learned about color fill, screen coordinates (X & Y axis), and how to choose your screen layout. True, there is much more, but this is one big step forward in learning how to use your machine.

Let SUM know what you think of such articles as well as others. Remember, you are the ones who make or break a magazine! Lets all do our best to help keep such magazines alive and well. It's the only media that we have available for reaching many people.

I hope that this may help many of you out there get a start. I will reply to any questions that you may have concerning this article, or any other. Please send a SASE. Give full details of your problem and I will do my best to answer them.

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